

HOW DRUGS AFFECT THE BRAIN



Module 6

Module 6

Guide to Module 6:

How Drugs Affect the Brain

Introduction

Students are nearing the end of the *Brain Power!* program. Over the last five modules, students have learned how to use scientific inquiry to perform experiments (modules 1 and 5), how to identify the parts of the brain and their functions (module 2), what neurotransmission is (module 3), the difference between medicines and harmful drugs (module 4), and the effects nicotine has on the brain and the body (module 5). This final module serves as a culminating activity and as an embedded assessment for the entire program. Using the information provided on four fact sheets, along with their prior knowledge, students will explain how cocaine, marijuana, alcohol, and nicotine affect the brain and the rest of the nervous system. Students may use the model of the brain, the neurotransmission simulation they performed, or any other activity—such as putting on a play, making a poster, or developing a comic strip—to explain their ideas.

Learning Objectives

- Students review information about four drugs—cocaine, marijuana, alcohol, and nicotine.
- Students apply what they have learned in the previous modules to explain how these drugs affect the brain and the rest of the nervous system.
- Students present their findings to members of their class.

Relationship to the National Science Education Standards

This mission aligns with the following two standards identified in the NSES: science as inquiry and science in personal and social perspectives. The chart that follows identifies how the mission aligns with each of these standards.



SCIENCE AS INQUIRY	
Levels K–4	How Mission is Aligned
Abilities necessary to do scientific inquiry	Students experience some of the steps in the process of scientific inquiry: developing a hypothesis, completing an investigation to test the hypothesis, and drawing conclusions.
SCIENCE IN PERSONAL AND SOCIAL PERSPECTIVES	
Levels K–4	How Mission is Aligned
Personal health	Students observe the effects that four drugs have on the brain and the nervous system. They discuss the impact this information has on their lives and how they can use it to make wise decisions about their own health.
Background	

Background

Different drugs have various effects on the body. People are motivated to take drugs because of the feeling of euphoria they experience as the drugs change the way the brain normally works. Some of the changes that happen in the brain following drug use are short-term, while other changes can last a long time.

Prolonged drug use can change the brain so that addiction results. Addiction is a disease caused by changes in the structure and functioning of the brain. Addiction is characterized by:

- A strong compulsion or drive to use drugs despite negative consequences (someone keeps using drugs even though he or she is having problems);
- Loss of control over amount of the drug used (using more than he or she plans) and over drug-related behavior (someone does or says things he or she would not ordinarily do);

- Intense craving for the drug when it is not available. This craving is due to changes in the brain. Once a person is addicted, he or she must have the drug just to keep from feeling bad. This is because drugs can cause changes in the functioning of neurotransmitters in the brain.

When a person stops using a drug, it takes a while for the brain to get back to normal. During that time, the person may feel bad and have intense craving for the drug. Research in animals and some humans is beginning to suggest that some drugs may cause changes that are permanent. Addiction is considered a disease because the drugs have changed the normal functioning of the brain. Addiction can be successfully treated. However, the best way to avoid addiction is to never start using drugs.

Cocaine

Cocaine is a stimulant made from the leaf of the coca plant. Cocaine speeds up activity in the brain and the spinal cord, causing an increase in blood pressure and heart rate and a decrease in the flow of blood and oxygen to the heart. When someone snorts, injects, or smokes cocaine, it travels to the brain very quickly. It reaches all areas of the brain but has its greatest effects in the front part of the cerebral cortex and on part of the limbic system.

A very complicated process takes place in the brain after it is exposed to cocaine. In a normal brain, the neurotransmitter dopamine is released by neurons to carry messages in the limbic system. After the message has been carried to the next neuron, dopamine is reabsorbed from the synapse back into the neuron that released it. Cocaine blocks the reabsorption of dopamine, leaving too much dopamine in the synapse. The excess dopamine is what causes the pleasurable feelings associated with taking cocaine and the increased motor activity seen with higher doses.

After a person abuses cocaine for a while, the brain tries to compensate for the excess dopamine, and the normal processes that take place are disrupted. The brain will no longer function normally without cocaine.

Marijuana

Marijuana is the dried leaves and flowers of the cannabis plant. More than 400 chemicals can be found in the average cannabis plant. The active ingredient in marijuana that produces changes in brain messages is called tetrahydrocannabinol (THC). The brain has receptors for a specific chemical, anandamide, which is naturally produced by the brain. THC is able to attach to and activate these same receptors. These receptors are called THC receptors rather than anandamide receptors because scientists knew that THC attaches to these receptors long before anandamide was discovered.

Scientists know less about how marijuana affects the nervous system than they do about other drugs. However, scientists know that some areas of the brain have a lot of THC receptors, while other areas have very few or none. When a person uses marijuana, the chemicals in the drug travel through the bloodstream and attach to the THC receptors, activating them and interfering with normal neurotransmission.

The areas of the brain with the most THC receptors are the cerebellum, the cerebral cortex, and the limbic system. This is why marijuana affects thinking, problem solving, sensory perception, movement, balance, and memory.

Alcohol

Alcohol is found in beer, wine, and spirits, e.g., gin, vodka, or whiskey. It affects the brain and almost every other organ in the body. The parts of the brain affected by alcohol are the cerebral cortex, limbic system, and brain stem. Alcohol interferes with messages carried by many neurotransmitters in the brain. Because these neurotransmitters are found throughout the brain, alcohol affects many functions, including thinking, coordination, and emotions.

If a person becomes addicted to alcohol, he or she might be diagnosed with the disease known as alcoholism. Alcoholism can be life-threatening. The long-term use of alcohol results in the depletion of certain vitamins and minerals in the body. These deficiencies can result in diseases like Wernicke-Korsakoff syndrome, a disease that affects the short-term memory and, in some cases, can result in a permanent loss of memory.

Nicotine

Nicotine comes from tobacco leaves and is found in all tobacco products—cigarettes, cigars, pipe and chewing tobacco, and snuff. Nicotine acts on the central and peripheral nervous systems. It also causes an increase in blood pressure, heart rate, and respiration.

Nicotine is shaped like the neurotransmitter acetylcholine, which is involved in movement, breathing, heart rate, learning, and memory. When nicotine gets into the brain, it hooks onto the place where acetylcholine would normally go and overexcites the brain.

Nicotine also affects the neurotransmitter dopamine. Scientists think that nicotine's effects on dopamine are what cause the pleasurable sensations smokers experience. The long-term effects of smoking include lung cancer, emphysema, heart disease, and addiction. The longer a person smokes, the harder it is to quit. Fewer than 1 in 10 people who try to quit smoking actually succeed.

The chart below summarizes the effects that these four drugs have on the brain and body.

Drug	Effects on the Brain and Body	Parts of the Brain Affected
Cocaine	(1) Increase in blood pressure and heart rate (2) Change in emotional behavior (3) Impaired thinking and decision making	(1) Brain stem (2) Limbic system (3) Cerebral cortex
Marijuana	(1) Short-term memory loss (2) Impaired thinking and problem solving (3) Impaired movement	(1) Limbic system (2) Cerebral cortex (3) Cerebellum
Alcohol	(1) Impaired thinking and problem solving (2) Change in emotional behavior (3) Impaired coordination	(1) Cerebral cortex (2) Limbic system (3) Cerebellum
Nicotine	(1) Increase in respiratory rate and blood pressure (2) Increases the amount of the neurotransmitter dopamine present in synapses	(1) Brain stem (2) Limbic system

Materials

NIDA Junior Scientists DVD

Fact sheets

Brain model (from module 2)

Student instruction sheet (from module 3)

Riddles (from module 4)

Log sheets

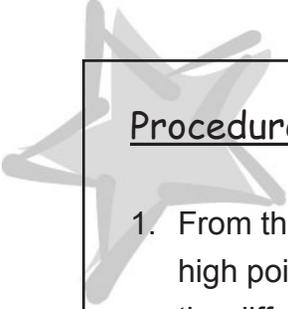
Trading cards

Paper and pencils

Preparation

1. Divide the class into groups of three for this activity.
2. Make one copy of the fact sheets, the instruction sheet, and the log sheet for each student.
3. Make sure you have the materials from the first five modules available for this activity. These include the students' models of the brain, the instruction sheets from the previous modules, the log sheets from the previous modules (in each student's portfolio), and the riddles from module 4. Lay out the materials on a table so that you can refer to them during the activity.

It may take students more than one class period to complete this activity.



Procedure

1. From the previous modules, point out the materials on the table. Briefly discuss the high points of each module, which include: the parts of the brain, neurotransmission, the difference between helpful and harmful drugs, and what tobacco does to the body. Tell the students that they are going to draw some conclusions about what they have learned during the *Brain Power!* program and to apply that knowledge to substances they did not study. Ask students if they remember what the first step is in scientific inquiry. Help the class remember that the first step is to *observe* and *describe* these materials.
2. After the class shares its ideas, tell students to get into groups of three. Have each group develop conclusions based on all they have learned during the program. Then have each student record his or her group's conclusions on the log sheet. For example, one possible conclusion may be: "It is important to take care of your brain by not putting unnecessary drugs into your body." Each group's conclusion should emphasize the importance of not taking any substance that could harm the way the brain and the nervous system work. Have each group use the information in the previous modules to explain why they shouldn't put unnecessary drugs into their body.
3. Now give students an opportunity to apply what they learned to two new substances. Give half the groups the fact sheets about cocaine and alcohol and half the groups the fact sheets about marijuana and nicotine. Tell students that their mission is to determine how these drugs affect the brain and the nervous system. Then students will have an opportunity to present their ideas to the class. Their presentations can use the model of the brain, the neurotransmission simulation game, or the riddles. They also can develop a skit, make a poster, write a comic strip, or develop their own unique presentation.

- 4. CONGRATULATIONS! YOUR STUDENTS HAVE JUST COMPLETED THE LAST MODULE IN THE *BRAIN POWER!* PROGRAM.**

When your class has completed the *Brain Power!* program, place the reverse sides of all six posters together to create the certificate of completion. The students can all sign their names to indicate that they are now NIDA Junior Scientists!

Discussion Questions

1. Have each group give its presentation. After the presentations, discuss how cocaine, marijuana, alcohol, and nicotine affect the brain and the nervous system.
2. Have each student summarize what he or she learned during the *Brain Power!* program. Ask each student to read his or her summary to the class.
3. Ask students to think of one thing they would tell their friends and family about the program. Suggest that they make a poster of their one thought and share it with their families.

Extensions

The activities listed below provide links to other areas in the curriculum. These activities also make use of the trading cards included in the module.



1. Put out the trading cards from all six modules. Have the students look them over and think about other ideas for cards. Then ask each student to create one new trading card on a subject relevant to the *Brain Power!* program.



2. Have the students imagine that a good friend has just started smoking. Ask the students to decide what they would say to their friend to convince him or her to stop smoking. Then ask for volunteers to act out the scene.

Assessment

This lesson is an embedded assessment of what students have learned throughout the *Brain Power!* program. As students work, observe whether they have mastered the following:

1. Can each student develop conclusions that reflect the work done in the modules?
2. Can groups of students apply what they have learned about a substance to its effect on the brain and the nervous system?
3. Are students approaching the task logically and methodically?
4. Are students able to synthesize the information to create a presentation that is engaging and accurate?
5. Are students able to summarize what they did and develop a clear, crisp statement expressing their conclusions about the program?

Additional Activities

Below are some additional activities that can be used after completion of the sixth mission. These activities are extensions to many other areas of the curriculum.



1. Develop a board game showing how drugs affect the brain and the nervous system. The object of the game could be to match the drug with the part of the body it affects, or to solve problems using the processes of scientific inquiry.



2. Develop or identify a new scientific question or problem and then use the processes of scientific inquiry to solve it. For example, the problem could be how fast your heart beats before and after exercise, or how your tongue knows how different foods taste. Encourage your students to design their own experiments.



3. Build a more complex model of the brain than the one built in module 2. Use science books or Web sites to find a model. Then use clay or other materials to make a more anatomically detailed model.



4. Write a play summarizing what you have learned about drugs. The play could focus on different drugs and what they do, how drugs affect the brain and the nervous system, or why smoking is a bad habit to start. The students may want to invite other classes in the school to see their play.

Resources

The lists below include resources for teachers and students.

Resources for Teachers

National Institute on Drug Abuse (NIDA)

www.drugabuse.gov, 301-443-1124

This Web site contains information about drug abuse and a section designed specifically for parents, teachers, and students.

NIDA Drug Pubs

drugpubs.drugabuse.gov, 1-877-NIDA-NIH (1-877-643-2644)

Drug Pubs is NIDA's research dissemination center. Visitors can order hard copies of NIDA publications or download electronic versions in multiple formats.

Sara's Quest

This site from NIDA contains a multiple choice game on a variety of drug related categories.
teens.drugabuse.gov/sarasquest/index.php

National Clearinghouse for Alcohol and Drug Information (NCADI)

<http://store.samhsa.gov>, 1-800-729-6686

NCADI provides information and materials on substance abuse. Many free publications are available here.

Eisenhower National Clearinghouse (ENC)

www.goenc.com, 1-800-471-1045

This Web site provides useful information and products to improve mathematics and science teaching and learning.

Bellenir, K., ed. *Drug Abuse Sourcebook. Health Reference Series*, Omnigraphics, Inc., 2010. Basic health-related information about the abuse of legal and illegal substances such as alcohol, tobacco, marijuana, and cocaine.

Greenfield, S.A. *The Human Brain: A Guided Tour*. New York: Basic Books, 1998. Written for a lay audience, provides a holistic view of the brain as an integral part of the body; part of the Science Masters Series.

Resources for Students

National Institute on Drug Abuse (NIDA)—Mind Over Matter

<http://teens.drugabuse.gov/mom/index.asp>

Series developed to educate children about the effects of drug abuse on the body and the brain.

Friedman, D., & Neuhaus, D. *Focus on Drugs and the Brain*. Frederick, MD: Twenty-First Century Books, 1990. Part of the “Drug-Alert Book” series. Describes the function of the brain and nervous system and how drugs affect the body.

Neuroscience for Kids

<http://faculty.washington.edu/chudler/neurok.html>

Explores the brain and spinal cord; lists the effects of drugs on the brain and nervous system.

Student Instruction Sheet

Module 6: How Drugs Affect the Brain

1. It's time to pull all your ideas together and figure out exactly what you learned about how different drugs affect the brain.
2. Look at all the materials laid out on the table. They are from the first five modules you worked on. Begin by observing the materials and describing them. Then discuss the high points of each module with the class.
3. Your teacher will assign you to a group. With your teammates, develop a few conclusions that bring together what you learned during the *Brain Power!* program. If you need some ideas, your teacher can give you an example. Then write your group's conclusions on your log sheet.
4. Now see if your knowledge of the brain can be applied to materials you did not study. Your teacher will give half the groups fact sheets on cocaine and alcohol, and half the groups fact sheets on marijuana and nicotine. Your mission is to figure out how these drugs affect the brain and the nervous system. See if what you find out supports your conclusions about what you have learned.
5. After learning about the new substances, think about how to present your ideas to the class. You may use your model of the brain or the neurotransmission simulation game. Perhaps your group would like to develop a skit, make a poster, or write a comic strip. Anything goes! Have fun, and focus on something interesting and original. Make sure you tell the class whether your research proved or disproved your conclusions.

6. When it's your group's turn, give your presentation to the class. Then discuss how cocaine, marijuana, alcohol, and nicotine affect the brain and the nervous system.
7. There's one more thing to do. If you could tell your family and friends one idea about the *Brain Power!* program, what would it be? Write down your thoughts in a paragraph or describe them on a poster.
8. **CONGRATULATIONS! YOU HAVE JUST COMPLETED THE LAST MODULE IN THE *BRAIN POWER!* PROGRAM.**

Put the last piece in the puzzle poster to receive your diploma.

Fact Sheet

Cocaine

Cocaine affects many different parts of the brain, including the brain stem, limbic system, and cerebral cortex. Cocaine makes the heart beat faster and makes blood pressure go up. It can change the way someone feels and acts. It also makes it harder for people to make smart decisions. Cocaine changes the way neurons talk to each other. It fools the brain into thinking there's too much of the neurotransmitter dopamine, so the brain doesn't make as much dopamine as it should. Then there isn't enough dopamine in the brain, and the neurons need cocaine to work correctly. Cocaine is a very addictive drug, so when people use it, they often find it really hard to stop.

Think about . . .

1. What parts of the brain and nervous system do cocaine affect?
2. How could you use your model of the brain to show how cocaine affects the brain?
3. How could you use your neurotransmission model to show how cocaine affects communication?
4. What kind of poster could you make to show how cocaine affects the brain?
5. If you could write one message about the dangers of cocaine, what would it be?

Fact Sheet

Marijuana

Marijuana affects several parts of the brain, including the limbic system, cerebral cortex, and cerebellum. Marijuana can make it harder to remember things, think clearly, and solve problems. It also changes the way neurons talk with each other. Marijuana can also have some negative effects on health. When a person uses marijuana, he or she increases the risk of harming the lungs. Marijuana is an addictive drug that changes the way the brain functions. Once the brain has been changed by marijuana, it may not work normally without it.

Think about . . .

1. What parts of the brain does marijuana affect?
2. How could you use your model of the brain to show how marijuana affects the brain?
3. How could you act out how marijuana affects the brain?
4. If you could write one message about marijuana, what would it be?

Fact Sheet

Alcohol

Alcohol affects many parts of the brain, including the brain stem, cerebral cortex, and limbic system. Alcohol makes it harder to think clearly and remember things. It blocks messages going to the brain from other neurons, and it interferes with balance. It also changes the way someone feels and acts. After consuming alcohol over a long period of time, a person may start to need it to keep from feeling bad. When that happens, the person most likely has a disease called alcoholism.

Think about . . .

1. What parts of the brain and nervous system does alcohol affect?
2. How could you use your model of the brain to show how alcohol affects the brain?
3. How could you use your neurotransmission model to show how alcohol affects communication?
4. If you could write one message about alcohol, what would it be?

Fact Sheet

Nicotine

Nicotine affects several parts of the brain, including the brain stem and limbic system. It causes the heart to beat faster and the lungs to work harder. It also affects the neurotransmitters acetylcholine and dopamine. Scientists think that nicotine's effect on these neurotransmitters causes addiction to nicotine. Smoking is a bad habit to avoid because it can cause many serious diseases, including cancer and heart disease. For many people, it's very difficult to stop smoking once they've started.

Think about . . .

1. What parts of the brain and the nervous system does nicotine affect?
2. How could you use your model of the brain to show how nicotine affects the brain?
3. If you could write one message about nicotine, what would it be?

**If you do not have a DVD player, read this story
to your class to introduce the mission.**

Introductory Story for Module 6

“I don’t know about you, Brain Trust, but my head is spinning,” said Brain Wave.

“What do you mean?” replied Brain Trust.

“We’ve learned so much in such a short period of time. First, we learned about the brain and everything it does. Then we learned about how messages are sent throughout the body. And that’s just the beginning!”

“I guess you’re right,” said Brain Trust. “Then we moved on to find out about medicines, drugs, and nicotine. It has been a lot. No wonder your head is spinning.”

“What can we do to make sense of it all?” asked Brain Wave.

“Well, those steps of scientific inquiry could help,” suggested Brain Trust. “You know, observe, hypothesize, experiment, and conclude.”

You’re right. We could try to figure out what all these different ideas have in common,” said Brain Wave.

Just then, they heard the computer dinging, and they saw their trusty friend Corty on the screen. “Couldn’t help overhearing your conversation. What do all these ideas have in common? How can we use the steps of scientific inquiry to put all of the modules together?” Corty said.

Brain Wave and Brain Trust looked at each other. They weren’t sure. What do you think? Can you come up with a way to tie all this information together? Talk to your classmates. By figuring out the last problem of the NIDA Junior Scientists Program, you become a member of the club. Good luck, and may the tools of science be with you.



Name: _____

Log Sheet

Your group's observations

Your group's conclusions

Your group's presentation



BRAIN POWER NEWS

Parent Newsletter

Volume 1, Number 6

How Drugs Affect the Brain

Your child is nearing the end of the *Brain Power!* science program. Over the last five modules, your child has learned how to use scientific inquiry to perform experiments, how to identify the parts of the brain and their functions, what neurotransmission is, the difference between medicines and harmful drugs, and the effects of nicotine and tobacco on the brain and the body. During the last module, your child had an opportunity to learn about how four substances—cocaine, marijuana, alcohol, and nicotine—affect the brain and the rest of the nervous system.

To help students complete this task, they received fact sheets about two of the four substances. For your reference, this information is summarized below.

Drug	Effects on the Brain and Body	Parts of the Brain Affected
Cocaine	(1) Increase in blood pressure and heart rate (2) Change in emotional behavior (3) Impaired thinking and decision making	(1) Brain stem (2) Limbic system (3) Cerebral cortex
Marijuana	(1) Short-term memory loss (2) Impaired thinking and problem solving (3) Impaired movement	(1) Limbic system (2) Cerebral cortex (3) Cerebellum
Alcohol	(1) Impaired thinking and problem solving (2) Change in emotional behavior (3) Impaired coordination	(1) Cerebral cortex (2) Limbic system (3) Cerebellum
Nicotine	(1) Increase in respiratory rate and blood pressure (2) Increases the amount of the neurotransmitter dopamine present in synapses	(1) Brain stem (2) Limbic system

continued

Our goal in introducing this material is to provide scientific information about the effects of drugs on the body. By presenting the material to students when they are still young, we hope to lay a foundation upon which they can build ideas as they grow. We also hope that their early exposure to this information will help them make healthful choices about drugs in the future. We encourage you to discuss these issues with your child. Ask your child what he or she learned from the program. What overall impressions has he or she brought away from the *Brain Power!* program?



Science at Home

At school, your child was asked to write down one message that he or she would convey to family and friends after completing the *Brain Power!* program. Try this activity as a family. What is one message about the brain and drugs that your family would like to convey to others? Then send the message on to a friend and ask him or her to spread the word. Friends and family members are influential people in children's lives. We believe the more people repeat the message about the harmful effects drugs can have, the clearer the message will be for children.



What Does Your Child Think?

Have your child draw or write something about how drugs affect the brain.

Additional Resources

The books and Web sites listed below have more information about drugs.

National Institute on Drug Abuse (NIDA)

www.drugabuse.gov, 301-443-1124

This Web site contains information about drug abuse and a section designed specifically for parents, teachers, and students.

NIDA Drug Pubs

drugpubs.drugabuse.gov, 1-877-NIDA-NIH
(1-877-643-2644)

Drug Pubs is NIDA's research dissemination center. Visitors can order hard copies of NIDA publications or download electronic versions in multiple formats.

National Institute on Drug Abuse (NIDA)—Mind Over Matter

www.nida.nih.gov/MOM/MOMIndex.html

Series developed to educate children about the biological effects of drug abuse on the body and the brain.

National Clearinghouse for Alcohol and Drug Information (NCADI)

<http://store.samhsa.gov>, 1-800-729-6686

NCADI provides information and materials on substance abuse. Many free publications are available here.

Bellenir, K., ed. *Drug Abuse Sourcebook*. Health Reference Series, Omnigraphics, Inc., 2010. Basic health-related information about the abuse of legal and illegal substances such as alcohol, tobacco, marijuana, and cocaine.

Friedman, D. *Focus on Drugs and the Brain*. Frederick, Maryland: Twenty-First Century Books, 1990. This book, part of the "Drug-Alert Book" series, includes a section on each drug of abuse and addiction.

Neuroscience for Kids

<http://faculty.washington.edu/chudler/nic.html>

This site includes a section on the history of tobacco, cigarette smoking, nicotine addiction, and the effect of nicotine on the brain.



STIMULANTS

Cocaine
Caffeine
Nicotine



Stimulants are a group of drugs that excite the neurons in the brain. Stimulants speed up activity in the brain. Some stimulants are very addictive, such as cocaine and nicotine. Caffeine is also a stimulant. Caffeine is usually not dangerous when used carefully.



DEPRESSANTS

Sedatives
Alcohol



Depressants are a group of drugs that slow down the activity in the brain and body. Depressants impair thinking and memory. Regular use of these drugs can lead to addiction. Alcohol is the most commonly used depressant.



NIDA NEUROLOGIST

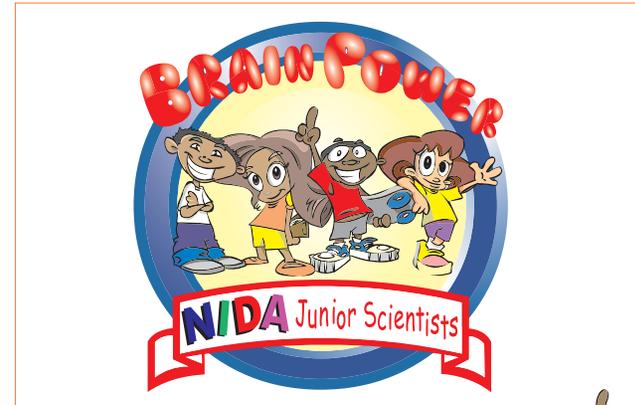


A neurologist is a doctor who cares for the nervous system, including all the neurons and nerve pathways in your body. You can go to this doctor if you need help for brain or nerve diseases. Neurologists work in hospitals, offices, and clinics.

There are special neurologists just for kids.



NIDA BRAIN POWER



Brain Power! has taught us many important things about science. We know that we can all be scientists by using the process of scientific inquiry. We have already learned a lot of information about the brain and how it works. We have also learned about different medicines and drugs and how they affect the brain. *Brain Power!* rules!





STIMULANTS

Cocaine
Caffeine
Nicotine

Stimulants are a group of drugs that excite the neurons in the brain. Stimulants speed up activity in the brain. Some stimulants are very addictive, such as cocaine and nicotine. Caffeine is also a stimulant. Caffeine is usually not dangerous when used carefully.



DEPRESSANTS

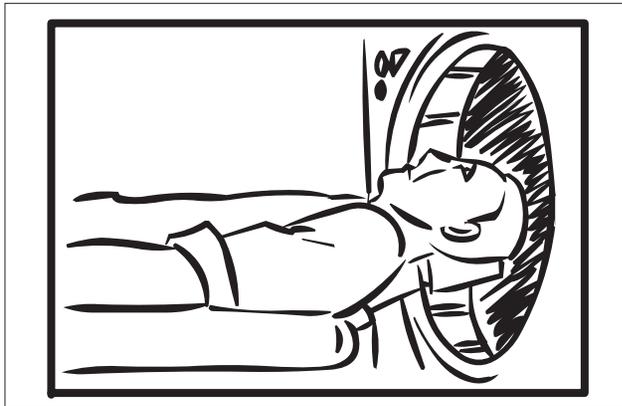
Sedatives
Alcohol

Depressants are a group of drugs that slow down the activity in the brain and body. Depressants impair thinking and memory. Regular use of these drugs can lead to addiction. Alcohol is the most commonly used depressant.





NEUROLOGIST



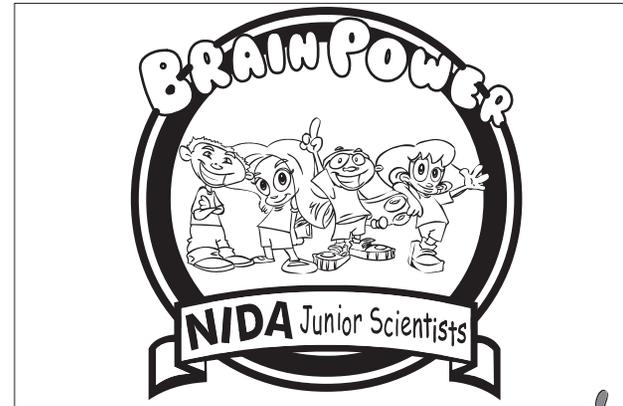
A neurologist is a doctor who cares for the nervous system, including all the neurons and nerve pathways in your body. You can go to this doctor if you need help for brain or nerve diseases. Neurologists work in hospitals, offices, and clinics.



There are special neurologists just for kids.



BRAIN POWER



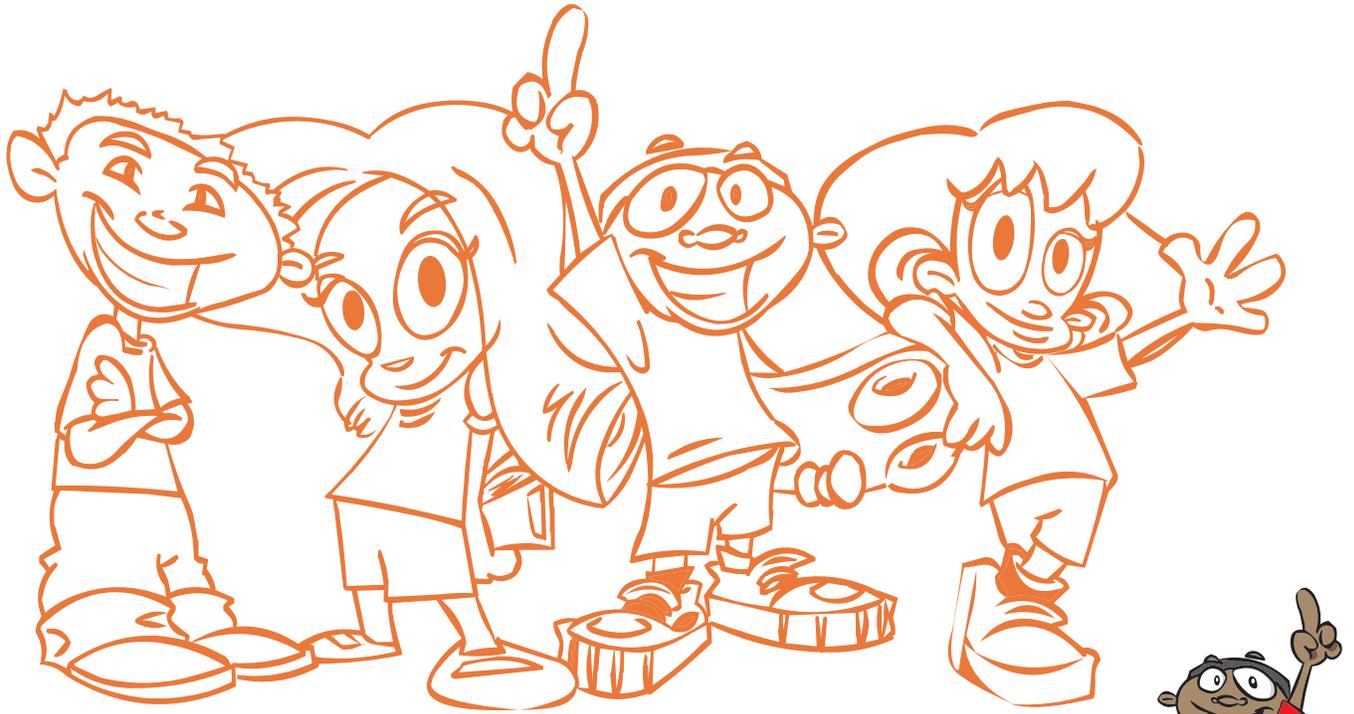
Brain Power! has taught us many important things about science. We know that we can all be scientists by using the process of scientific inquiry. We have already learned a lot of information about the brain and how it works. We have also



learned about different medicines and drugs and how they affect the brain. *Brain Power!* rules!



HOW DRUGS AFFECT THE BRAIN



Brain Power has taught us many very important things. This is what we learned:

- The process of scientific inquiry—observing, making predictions, performing experiments, and making conclusions.
- The parts of the brain and how information is sent throughout the body.
- The differences between drugs used as medicines and harmful drugs.
- The effects that alcohol, nicotine, and other drugs have on the body and the brain.